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Perceived validation and criticism in pain: development of a new measure in chronic pain

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Significance: The current study provides a new 23-item measure of perceived validation and criticism by others in chronic pain that overcomes the limitations of existing measures. It adds to the literature by suggesting that perceived criticism (but not validation) contributes to functional impairment beyond sociodemographic variables, pain intensity, affect, and related constructs such as social safeness and compassion from others. These results suggest that psychosocial interventions that aim to promote functioning in chronic pain should focus on the subjective experience of being criticized and validated by significant others.

ABSTRACT

Background: Research suggests that the way others react to a pain flare-up impacts on psychological and pain-related symptoms in chronic pain (CP). Experiencing validation from others is associated with less negative emotions and better functioning. Contrarily, experiencing criticism is linked to greater pain intensity and worse functioning. Nonetheless, studies are limited by an exclusive focus on spouses rather than significant other relationships, the use of proxy constructs (e.g., social support, responsiveness, solicitousness) rather than specific measures of validation and criticism, and a focus on significant others′ behavior rather than patients′ subjective experience. This study examines the psychometric properties of a new measure - Perceived Validation and Criticism in Pain Questionnaire (PVCPQ), and tests its contribution to functional impairment beyond pain intensity, sociodemographic and medical-related variables, positive and negative affect, safeness, and compassion from others.

Methods: Women with CP (N=172), 130 (75.6%) of whom had fibromyalgia, completed an online battery of questionnaires (PVCPQ; numeric pain rating scale; work and social adjustment scale; positive and negative affect schedule; social and pleasure scale; compassionate engagement and action scale). Exploratory factor analysis (EFA), reliability analysis, correlational analysis and hierarchical regression analysis were performed.

Results: EFA showed a 23-item two-factor solution with good psychometric properties. Criticism in pain (but not validation in pain) contributed to functional impairment above and beyond the variance explained by pain intensity, sociodemographic and medical variables, positive and negative affect, safeness and compassion from others.

Conclusions: These findings suggest that the PVCPQ is a psychometrically valid new measure of perceived validation and criticism in pain that contributes to explaining pain-related functional impairment.

Key-words: chronic pain; validation; criticism; compassion; functional impairment.

INTRODUCTION

Validation is an interpersonal process through which one individual communicates to another that their experience is understandable, accepted and "makes sense" (Fruzzetti and Iverson, 2004; Linehan, 1993). In chronic pain (CP), validation constitutes any behavior that communicates that the pain-related emotional experience and overall suffering is legitimate, understandable, and accepted (e.g.,Cano and Williams, 2010). Studies suggest that validation correlates with less intense negative emotions (Edlund et al., 2015; Vangronsveld and Linton, 2011; Wilson et al., 2017). However, these studies present several limitations. Firstly, they mainly focus on partner´s responsiveness and solicitousness (e.g., providing pain medication, helping with chores, asking how they can help) (Newton-John, 2002), which are not necessarily validation. Also, studies have used social support measures as a proxy to validation, when in fact they measure distraction and problem-solving behaviors [e.g. the support subscale of the Multidimensional Pain Inventory (MPI; Kerns et al., 1985)], and/or satisfaction with support [the Social support in Pain Questionnaire (SPQ; Lugt et al., 2011)] rather than validation. Additionally, many studies have used observational coding systems (e.g.,Cano et al., 2008; Edmund and Keefe, 2015; Leong et al., 2011), which tell us little about the subjective experience of being validated. Indeed, there is more evidence on objective validation behaviors from others than on the subjective emotional experience of validation, which may be mediated by intrapersonal cognitive-affective processes (Fekete, Stephens, Mickelson, & Druley, 2007; Newton-John, 2002). Moreover, validation overlaps theoretically with compassion, sharing elements such as acceptance, empathy, and non-judgment. Compassion correlates positively with pain functioning (Purdie & Morley, 2016), suggesting the need for a more detailed exploration of the unique contribution of validation to functioning in CP.

Criticism from significant others is linked to greater pain intensity and decreased functioning in CP (e.g.,Burns et al., 2013; Burns et al., 2018; Alschuler and Otis, 2012). However, research has been more focused on others′ (particularly spousal) critical behavior and cognition, and less on patient´s perception of criticism (Cano and Tankha, 2018). When studies do focus on perception of criticism, they regularly use the Hooley and Teasdale (1989) 1-item measure of criticism ("How critical of you was he/she during the past 3 hours?") (e.g., Burns et al., 2018), which may fail to grasp such a complex construct as criticism. Some studies overcome this limitation of 1-item measures by using the punishing responses subscale of the MPI, which measures some aspects of criticism, such as anger, irritation, frustration, and ignoring (Kerns et al., 1985), but not necessarily the nuances of criticism [dismissiveness, put-down, comparative criticism, and shaming behaviors (e.g.,Gilbert et

al., 2004; Thompson and Zuroff, 2004). It may indeed occur that others do not express negative emotions nor punitive behaviors, but are nonetheless critical (e.g.,engaging in shame- and guilt-provoking behaviors, without hostility nor overt punishment), contributing to depression and anxiety (Gilbert, 2000; Cheung et al., 2004).

This study explores the psychometric properties of a new measure specifically developed to assess the subjective perceptions of validation and criticism that people with persistent pain experience from their significant others (The Perceived Validation and Criticism in Pain Questionnaire – PVCPQ) and examines the effect of PVCPQ on pain-related functional impairment.

METHOD

Scale Development

The PVCPQ was developed to measure the perception of being validated and criticized when experiencing pain by individuals with CP. Instead of focusing on social support, responsiveness and solicitousness, and on objective indicators of significant others′ behaviors, the PVCPQ focuses on the overall perception of one′s pain being subject of validation or criticism by others. Item development was based on a review of literature on validation and criticism, and on the available measures of proxy constructs, as well as on clinical experience with conducting psychological interventions for people with chronic pain. Experts in the field of validation and criticism, and/or CP, were asked to give feedback on the 26 items originally generated. Then, according to their feedback, minor changes were made, and an additional item was generated.

The item pool administered to participants had 27-items, measured on a 5-point scale (1 = never true; 5 = always true), hypothesized to reflect two distinct constructs: 1) the perception that others understand, validate and accept their pain experience (*validation in pain*), and 2) the perception that others ignore, put-down, negatively compare and criticize their pain experience (*criticism in pain*). The validation items aimed to assess elements of emotional validation (e.g., "People make me feel that my suffering is valid"), empathy (e.g., "People usually put themselves in my shoes when I am in pain"), emotional resonance (e.g., "When I am in pain, people tell me things that validate my suffering, such as "I can only imagine how tough and difficult it is that you are feeling this way") and acceptance (e.g., "When I am in pain, I feel that I can express my emotions"). The criticism items were developed to measure comparative criticism (e.g., "When I am in pain, people tell me I should be able to do things like others do"), put-down (e.g., "In social situations, people put me down for having pain"), negative judgment (e.g., "People judge me negatively for not knowing how to cope with my pain

better"), and anger and hostility (e.g., "People get angry at me when I can´t do certain activities due to my pain").

The main innovations of the PVCPQ include: 1) items were developed specifically for people with CP, rather than an adaptation of a general measure; 2) it focuses on significant others, rather than on a specific person such as a spouse; 3) it provides theoretically-driven items developed to assess validation and criticism, instead of the widely used proxy of "social support" (support, responsiveness/solicitousness, punishing); 4) it is a multi-item measure, which allows a comprehensive assessment of the validation and criticism constructs; 5) it focuses on the patient's subjective experience of feeling validated and/or criticized by others, rather than others′ objective behavior, which is a relevant element for psychological interventions for CP.

Participants

The current study was conducted in a convenience sample (i.e., non-probabilistic nor representative) of women with chronic musculoskeletal pain (N = 172). Data was collected through online self-report questionnaires. Participants were recruited through national associations offering support for people with CP. It should be noted that selecting a women-only sample was not an *a priori* intention, but rather a chance effect of recruitment (only 5 men participated). This sample was exclusively collected for the purpose of the current study. Inclusion criteria: a) having chronic musculoskeletal pain previously diagnosed by a healthcare professional; b) age > 18 years; c) being able to read and write Portuguese. Participants were excluded if their pain was due to malignancy. Participants were not compensated for participating in the study. See Table 1 for a description of the sample socio-demographic and medical characteristics.

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The current sample had a mean age of 49.01 (SD = 10.97). The majority of participants were married (n = 100; 58.1%), and had a bachelor′s degree (n = 58; 37.7%) or high school education (n = 60; 34.9%). The majority of participants were employed (n = 114; 66.7%), although some were unemployed (n = 23; 13.5%), students (n = 2; 1.2%) or retired (n = 32; 18.7%). Some were on work leave due to pain (n = 26; 15.1%), the majority were taking pain medication (n = 149; 86.6%), and had other chronic health conditions (n = 87; 50.6%). Most participants reported their CP diagnoses were delivered by a rheumatologist (n = 134; 79.3%), fibromyalgia was the most common diagnosis (n = 130; 75.6%), and the majority of participants had had CP for more than 10 years (n = 100; 58.1%). The majority had one CP diagnosis (n = 101; 58.7%), but some had two (n = 33; 19.2%), three (n = 19; 11.0%), four (n = 12; 7.0%), five (n = 6; 3.5%) and six (n = 1; 0.6%).

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Procedure

Eight nationwide CP associations (professional or patient-led associations) were contacted through email and/or Facebook pages and invited to collaborate by advertising the study to their mailing lists. These CP associations were non-profit, did not provide medical nor psychological treatment, but were sources of legal advice, information on latest scientific advances and where to get appropriate clinical help. Two of the eight associations agreed to collaborate. The link to the online battery of questionnaires was given and advertised. The online survey was accessed by 289 participants, 99 (34.3%) were excluded for not completing the survey. In addition, to attain a homogenous sample in terms of gender and nationality, five men and 13 non-Portuguese women completed the protocol but were excluded from the sample. The final sample was composed of 172 Portuguese women with CP.

Information regarding the goals and targeted population of the study was provided to participants. Confidentiality was assured, as well as that data would be anonymized and used exclusively for the purpose of this study. Participants provided informed consent by clicking on an "I accept to participate in the study" box at the beginning of the protocol. The study was delivered in an online platform (Limesurvey) hosted by a University server. The study was previously approved by the Ethics Committee of the Faculty of Psychology and Educational Sciences of the University of Coimbra.

Measures

In addition to the Perceived Validation and Criticism in Pain Questionnaire (PVCPQ), the psychometric analyses were conducted with the following questionnaires, all previously translated and validated for the Portuguese population:

Numeric Pain Rating Scale (NPRS; NPRS; Hartrick, Kovan, & Shapiro, 2003; Ferreira-Valente, Pais-Ribeiro, & Jensen, 2011) is a 1-item measure of pain intensity rated on an 11-point scale (0 = ''No pain''; 10 = ''Worst imaginable pain'') which respondents use to report the intensity of pain they are currently experiencing.

Work and Social Adjustment Scale (WSAS; Mundt, Marks, Shear, & Greist, 2002) is a measure of functional impairment composed of five items (work, home management, social leisure activities, private leisure activities, and family and other relationships) that respondents rate using a nine-point scale (0 = no impairment; 8 = very severe impairment). Higher scores mean greater impairment. The WSAS can be used as a measure of functional impairment in several medical problems by specifying the medical problem in the instructions. For this study, the instructions were primed for chronic pain. The current study found a Cronbach´s alpha of $\alpha = .90$.

Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; Galinha & Pais-Ribeiro, 2005) is a 20-item measure that assesses positive affect (e.g., interested, excited, inspired) and negative affect (e.g., distressed, scared, irritable) on a five-point scale (1 = very slightly or not at all; 5 = extremely). Respondents rate the degree to which they felt each emotion during the last week. This study had a Cronbach´s alpha of $\alpha = .90$ for the positive affect subscale, and $\alpha = .91$ for the negative affect subscale.

Social Safeness and Pleasure Scale (SSPS; Gilbert et al., 2009; Pinto-Gouveia, Matos, & Dinis, 2008) measures social safeness (i.e., the degree to which one experiences feelings of belongingness, connectedness and warmth in social relationships) on an 11-item scale. Each item is rated on a 5-point scale (0 = almost never; 4 = almost all the time), and higher scores translate into greater feelings of social safeness. In the current study, the SSPS had an α of .96.

Compassionate Engagement and Action Scales – Compassion from others (CAAS; Gilbert et al., 2017) are a set of three scales: one scale that measures the ability to be *self-compassionate*, one scale that measures the ability to be *compassionate towards others*, and one that measures the ability to receive *compassion from others*. Given the purpose of the current study, and in order not to burden participants, only the *compassion from others* scale was used. This scale has six items that measure the degree to which respondents perceive others to engage with them compassionately (i.e., being sensitive to their suffering, sympathetic, non-judgmental, empathetic, able to tolerate distress, and caring for their wellbeing) (e.g. "Others are accepting, non-critical and non-judgmental of my feelings of distress"), and four items that measure the degree to which respondents perceive others to act compassionately towards them (e.g. "Others think about and come up with helpful ways for me to cope with my distress"). The current study found an $\alpha = .93$ for the compassionate *engagement* subscale and $\alpha = .94$ for the compassionate *action* subscale.

Data analysis

All statistical analyses were conducted using SPSS statistics software version 23.0 (IBM corp., 2011).

To explore the factor structure of the PVCPQ, an exploratory factor analysis (EFA) was conducted using the Principal Component Analysis (PCA) parameter estimation method, and the Direct Oblimin rotation given the a priori assumption that both hypothesized factors would be correlated (Tabachnick & Fidell, 2007). Eigenvalues > 1, as well as scree plot analysis of points of inflection, were considered when deciding the number of factors retained (Johnson, 1998). Also, in order to confirm results from PCA, a parallel analysis (PA) was conducted to diminish potential problems related to factor over-extraction (Hubbard & Allen, 1987; Zwick &

Velicer, 1986). Factor extraction in PA is determined by comparing the eigenvalues from the PCA correlation matrix and the randomly generated eigenvalues in the PA. A factor should be retained when PCA eigenvalues are greater than the respective PA eigenvalues (Franklin, Gibson, Robertson, Pohlmann, & Fralish, 1995). The adequacy of data was assessed through the Kaiser Meyer-Olkin (KMO) test, in which KMO > 0.80 is considered adequate (Kaiser, 1974; Sharma, 1996). Extraction communalities were considered in order to estimate the variance of each item accounted for by the factors, in which values < .50 suggests the items should be extracted (Hair, Black, Babin, & Anderson, 1998).

Reliability was assessed through Cronbach's alphas, where $\alpha > .70$ were considered acceptable (Field, 2013), and considering item-total correlations >.50 (Nunnally, 1978; Tabachnick & Fidell, 2007).

Pearson´s correlation coefficients were analyzed in order to assess construct validity by correlating the PVCPQ, sociodemographic (age, years of education) and medical-related variables (number of CP diagnoses, taking medication, presence of other chronic illnesses), and other measures of related constructs (Cohen, Cohen, West, & Aiken, 2003).

Hierarchical regression analyses were performed to explore the relationship between PVCPQ and pain-related functional impairment, above and beyond pain intensity, positive and negative affect, feelings of social safeness, and perceived compassion from others (Haynes & Lench, 2003).

RESULTS

Preliminary Data Analyses

Preliminary analysis on the adequacy of data was performed and showed acceptable skewness and kurtosis values (SK < |3| and Ku < |8-10|) (in our sample, SK_{min} = -0.59 and SK_{max} = 0.45; Ku_{min} = -0.92 and Ku_{mas} = 0.06) and VIF <5 (Kline, 2005), which suggests normal distribution. There were no extreme outliers.

Exploratory factor analysis (EFA)

An initial EFA with Principal Component Analysis (PCA) was conducted, without rotation and using the Kaiser criterion (eigenvalues > 1) for extracting factors. Results showed the data was adequate [KMO = 0.946; χ^2 (351) = 3663. 60, $p < 0.001$], all communalities were greater than 0.50, and the eigenvalues suggested 3 factors: Factor 1 had an eigenvalue of 13.07, explaining 48.40% of variance. Factor 2 had an eigenvalue of 3.75 (13.88% of variance) and Factor 3 an eigenvalue of 1.05 (3.88% of variance). In order to confirm these results, and overcome potential over-extraction, a Parallel Analysis (PA) was conducted. Results suggested that only two components presented eigenvalues greater than the corresponding randomly generated matrix in PA

(eigenvalues for Factor 1 = 1.92, Factor 2 = 1.77, Factor 3 = 1.67), suggesting a two-factor solution as was hypothesized in the scale development. A two-factor solution was therefore forced, using the same extraction and rotation procedures described above . Results showed that the two-factor solution explained 62.28% of the variance. Three items presented extracted communalities < 0.50 (item 5 = 0.403; item 10 = 0.481; item 14 = 0.445), and one item loaded on the two factors (item 2) (see Table 2).

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Items 2, 5, 10 and 14 were removed and the analysis repeated. Results corroborated the adequacy of data (KMO = 0.946; χ^2 (253) = 3218. 39, $p < 0.001$). The solution explained 65.97% of the variance (Factor 1 = 51.84; Factor 2 = 14.13%), communalities were all greater than 0.50, and factor loadings clearly suggested that one factor was composed of items that reflect the construct "validation in pain" (items 1, 6, 7, 9, 17, 18, 19, 20, 22, 23, 24, 26, 27), and a second factor was composed of items that reflect the construct "criticism in pain" (items 3, 4, 8, 11, 12, 13, 15, 16, 21, 25). Thus, data supported a final 23-item version of PVCPQ composed of one factor that assesses feelings of *validation* when experiencing pain, and one factor that assesses feeling *criticized* when experiencing pain.

Internal consistency

According to corrected item-total correlations, all items presented an item-total correlation > 0.30. Cronbach´s alpha values suggested that both subscales had good internal consistency, with both "validation in pain" and "criticism in pain" presenting an $\alpha = 0.95$ (see Table 3). Alpha would not be improved by deleting any of the items.

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Correlation analysis

The PVCPQ was significantly correlated with pain-relevant measures and related constructs (see Table 4).

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Specifically, "validation in pain" was negatively associated with "criticism in pain", pain intensity, pain-related functional impairment and negative affect, and positively correlated with positive affect, feelings of safeness, and compassionate engagement and action from others. On the other hand, "criticism in pain" was negatively associated with positive affect, and compassionate engagement and action from others, and positively correlated

with pain intensity, pain-related functional impairment and negative affect. Age was positively correlated with positive affect and negatively with negative affect. Years of education was negatively correlated with pain intensity. The number of CP diagnoses was positively correlated with perceiving criticism, pain intensity, functional impairment, and negative affect, and negatively with safeness and compassionate engagement from others. Taking medication and having other chronic illnesses did not correlate with any other variables.

Hierarchical regression analysis

Hierarchical regression analyses were conducted in order to test the unique contribution of the PVCPQ in explaining the variance of pain-related functional impairment above and beyond other pain-relevant and/or closely related processes. Five models were examined, and pain-related functional impairment was predicted by progressively adding to the model predictors: step 1) validation in pain; step 2) criticism in pain; 3) pain intensity, the number of CP diagnoses, age, years of education, medication and other chronic illness; 4) positive and negative affect; 5) social safeness; and 6) compassionate engagement and action from others (see Table 5).

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Results showed that the overall model explained 48.5% of pain-related functional impairment, and that "criticism in pain" (but not "validation in pain") significantly added to the model above and beyond the effect of pain intensity, background variables, positive and negative affect, feelings of safeness and compassionate engagement and action. Although pain intensity is still the greater contribution to pain-related functional impairment (sr^2 = 12%), the perception of being criticized by significant others when experiencing pain is the second greatest contributor (sr^2 = 8%), more than negative affect (sr^2 = 4%) and positive affect (sr^2 4%). Overall, the PVCPQ, particularly its criticism subscale, significantly contributes to the variance of pain-related functional impairment.

DISCUSSION

The current study developed and validated a new multi-item measure of perceived validation and criticism in pain, in a sample of Portuguese women with CP (N = 172).

Results from EFA corroborated the hypothesized two-factor solution. Four items (2, 5, 10, 14) did not reach sufficient psychometric quality, thus were removed. The final version was composed of 23 items, each unequivocally loading on its previously hypothesized factor. The factor "validation in pain" assessed the overall perception that significant others understand and accept the participant's pain-related suffering and struggles (items 1, 6, 7, 9, 17, 18, 19, 20, 22, 23, 24, 26, 27). The factor "criticism in pain", on the other hand, measures

the overall perception that significant others are judgmental, shaming and generally critical of the pain experience and its associated limitations (items 3, 4, 8, 11, 12, 13, 15, 16, 21, 25). The two factors were significantly negatively correlated, which is in line with previous literature that suggests that criticism is inversely associated with validation-related constructs such as social support (e.g., Burns et al., 2018), acceptance (e.g., Costa and Pinto-Gouveia, 2011) and compassion (e.g., Purdie and Morley, 2016).

Correlation analysis showed that validation of pain was negatively associated with pain intensity and pain-related functional impairment. This seems to be aligned with existing studies using social support measures as proxy to "validation" showing negative association with pain (e.g., Goubert et al., 2005). Also, validation of pain was positively correlated with positive affect, and negatively correlated with negative affect. Previous studies show a similar pattern of results using proxy measures of validation (e.g., Edlund et al., 2015; Vangronsveld & Linton, 2011). Validation in pain was also positively correlated with feelings of safeness and connectedness, supporting similar results from studies of related constructs, such as self-compassion in pain (Carvalho et al., 2019). Indeed, results show that being validated by others when experiencing pain is positively related to perceiving compassion from others. To our knowledge, this is the first data on the relationship between perceiving validation and compassion from others. Results support theoretical propositions that recognize the relationship between these constructs (Gilbert et al., 2017). Expectedly, an opposite pattern of significant associations was found for criticism in pain. This finding supports previous studies that found correlations between criticism and pain intensity (e.g., Burns et al., 2013; Alschuler and Otis, 2012) and more negative affect (e.g., Burns et al., 2018).

Hierarchical regression analysis was conducted to test whether the PVCPQ was a significant predictor of pain-related functional impairment above and beyond background variables (sociodemographic and medical-related), well-established pain-related variables (pain intensity, positive and negative affect) and validation-related constructs (feelings of safeness, and compassion from others). Results showed that PVCPQ, particularly the "criticism in pain" subscale, was a significant predictor of pain-related functional impairment, even when controlling for pain intensity, age, years of education, number of CP diagnoses, medication and presence of other chronic illnesses, affect, feelings of safeness and connectedness and compassion from others. This suggests that experiencing others as critical towards one′s pain experience has a significant role in pain-related functional impairment. The contribution of criticism in pain is in addition to the impact of pain intensity and positive and negative affect. This expands our knowledge of the role of criticism in pain (e.g., Burns et al., 2013; Alschuler

and Otis, 2012) by controlling for the effect of conceptually relevant and negatively correlated constructs such as feelings of safeness and the perception of others engaging and acting compassionately.

These findings should be interpreted with some caveats about the current sample. Specifically, the majority of the sample were women with fibromyalgia. Thus, these results may be specific to fibromyalgia, and not generalizable to overall CP. For example, it is known that interpersonal relationships/events are particularly impactful in fibromyalgia (e.g., Wolf & Davis, 2014), and interpersonal stress is more strongly associated with pain in fibromyalgia than, for example, in osteoarthritis (e.g., Zautra et al., 1999). Also, individuals with fibromyalgia report more depression and fatigue than those with osteoarthritis or rheumatoid arthritis (e.g., Parrish et al., 2008), and less positive affect than individuals with osteoarthritis (e.g., David et al., 2001), which may explain the impactful role of interpersonal and intrapersonal variables in functioning. These results should be replicated in more heterogeneous samples of CP. Additionally, it should be noted that the relatively low magnitude of significant correlations between validation in pain, as well as its lack of unique contribution in the last step of regression analysis, seems to indicate that perhaps perceiving validation does not impact directly on functional impairment, but indirectly through other processes. For example, it may be the case that perceiving validation in pain leads to less psychopathological symptoms (depression, anxiety, etc), which in turn may lead to less functional impairment. It may also be the case that perceiving validation may lead to more help-seeking behaviors, which in turn might result in more valued living and less functional impairment. Future studies should conduct mediational analyses to test these hypotheses, preferably through time-lagged and/or experimental designs.

Overall, the interpretation of these results should consider the limitations of the study. Firstly, the sample was composed of women, which is not representative of the demographics of individuals with CP. Future studies should explore the psychometrics of the PVCPQ in a sample that is more balanced in terms of gender. Measurement invariance across genders could be tested using multi-group confirmatory factor analysis. In addition, although the sample size was sufficiently powered to provide robust evidence of factor structure, reliability and validity (Winter et al., 2009), future studies should replicate the analysis in a larger sample. Furthermore, the sample was not balanced in terms of CP diagnoses, with a disproportionately large percentage of individuals with fibromyalgia when compared to other CP conditions. Future studies should replicate these results in a more balanced sample in terms of CP conditions. It should also be noted that 99 participants were excluded for not completing the questionnaires. This potentially limits the generalization of these results. For

example, participants who did not complete the questionnaires might present more clinically significant psychopathological symptoms (e.g., depression) and/or more functional impairment, which could yield different results. Indeed, previous studies seem to suggest that women with more depressive symptoms are particularly vulnerable to the impact of criticism (e.g., Burns et al., 2018). This warrants caution in generalizing the results. Finally, the cross-sectional nature of the study design precludes drawing causal relationships between variables, findings remain correlational and preliminary. Future studies should conduct longitudinal and/or experimental designs to establish more accurate and causal conclusions of the predictive role of the PVCPQ.

Overall, future research should expand the study of the PVCPQ by exploring its sensitivity to clinical change on the one hand (e.g., it´s ability to detect changes in perceptions of validation and criticism after a psychological program for CP), and on the other hand its temporal stability (e.g., in a time-lagged design). Also, future studies should test incremental validity by comparing the PVCPQ with other measures of validation- and criticism-related constructs (e.g., the MPI or the SPQ), contributing to a more nuanced study of these constructs, and a better understanding of their role in pain.

The PVCPQ provides the opportunity to better understand the impact of relationships with significant others in CP, particularly the impact of perceiving validation and criticism. These constructs go beyond the coping-focused elements in social support, and the objectively quantifiable instances of support and hostility. It focuses on the emotional and subjective experience of validation and criticism by significant others, that are crucial cognitive and emotional data to further explore and inform patient-focused psychological approaches to CP. The PVCPQ is a novel and valid measure of perceived validation and criticism in pain, which may help advance our understanding of the mechanisms through which interpersonal relationships (i.e., the quality and type of relationship) impact on pain-related symptoms (e.g., intensity, disability, tolerance), mental health difficulties (e.g., psychopathological symptoms), seeking treatment (e.g., the anticipation of criticism from health professionals, compliance with treatment, adoption of pain management strategies) and health behaviors (e.g., sleep, physical activity).

In conclusion, the PVCPQ is a valid and reliable 23-items measure of perceived validation and criticism by significant others. Results suggest that both subscales (*validation in pain* and *criticism in pain*) are significantly correlated with pain intensity and pain-related functional impairment, positive and negative affect, feelings of safeness, and compassionate engagement and action from others. Finally, results suggest that perceiving criticism by others when experiencing pain contributes to pain-related functional impairment above

and beyond background variables (age, years of education, number of CP diagnoses, taking medication and having other chronic illnesses), pain intensity, affect, feelings of safeness and perceived compassion from others.

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Author Contributions

S.C. and P.C. have conceptualized and designed the study. S.C. has written the manuscript. All authors have contributed to the discussion of results and implications and commented on the manuscript.

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